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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,734	12/10/2003	Ilya Rushkin	339.7755USU	6685

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EXAMINER

LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/732,734

Applicant(s)

RUSHKIN ET AL.

Examiner

Sin J. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12, 14, 17, 18-29, 31, and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashiki et al (6,455,208 B1) in view of Matsuoka et al (5,397,682).

Yamashiki teaches (col.1, lines 40-43) a colored polymer thin film composed of a polymer such as a polyimide, and in his Production Example 3, Yamashiki obtains a 20% polyamic acid solution which contains solvents of *γ*-butyrolactone and N-methyl-2-pyrrolidone by reacting compounds including 4,4'-diaminodiphenyl ether (DAE) and 4,4'-oxydiphthalic dianhydride (OPDA). The DAE is the present 4,4'-diaminodiphenyl ether of claims 3 and 5-7, and the OPDA is the present 3,3',4,4'-diphenyloxidetetra-carboxylic acid dianhydride of claims 3, 4 (see structure XV), 6, and 7. Therefore, Yamashiki also teaches present polyamic acid of the formula X of present claim 2.

Although Yamashiki does not explicitly teach the use of an adhesion promoter in his invention, it is well known in the art to add an adhesion promoter to a polyimide precursor composition in order to improve an adhesion property of the polyimide coating film to a substrate as evidenced by Matsuoka et al, col.11, lines 21-40. Matsuoka includes *γ*-glycidoxypropylmethyldimethoxysilane (*which meets present formula IV of*

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present claim 1) as one of the examples for such adhesion promoting compounds.

Based on Matsuoka's teaching, it would have been obvious to one of ordinary skill in the art to add an adhesion promoter such as γ -glycidoxypolydimethylmethoxysilane into Yamashiki's polyamic solution so as to improve an adhesion property of his polyimide film to a substrate as taught by Matsuoka. Therefore, Yamashiki in view of Matsuoka would render obvious present inventions of claims 1-7, 9-11, and 14 (since Yamashiki teaches present polyamic acid of claims 2-7, it is the Examiner's position that Yamashiki's polyamic acid would inherently be soluble in aqueous tetramethylammonium hydroxide and would also inherently be resistant to a solvent used in a photosensitive composition with which the polyimide precursor composition is to be used as presently recited in claim 1).

With respect to present claim 8, in his Production Example 3, Yamashiki uses total of 1 mol of diamine compounds (DAE, PDA and SiDA) and 0.9975 mols of OPDA (a dianhydride compound). Therefore, Yamashiki in view of Matsuoka would render obvious present invention of claim 8.

With respect to present claim 12, in Production Example 3, Yamashiki uses solvents of γ -butyrolactone and N-methyl-2-pyrrolidone. In col.15, lines 7-14, Yamashiki teaches that an organic solvent which does not dissolve the polyimide precursor by itself, for examples, ethanol, butanol, isopropanol, methyl cellosolve, ethyl cellosolve, or propyleneglycol monomethyl ether, can be mixed with the solvent which dissolves the polyimide precursor. Therefore, it would have been obvious to one of ordinary skill in the art to use propyleneglycol monomethyl ether (which has boiling point of 118-119°C)

as the other solvent in Yamashiki's Production Example 3 with a reasonable expectation of obtaining a liquid crystal display exhibiting excellent display performance. Therefore, Yamashiki in view of Matsuoka would render obvious present invention of claim 12.

With respect to present claim 17, Matsuoka teaches that the amount of the adhesion promoter is preferably 0.5-10 parts by weight per 100 parts by weight of the polyimide precursor. The range overlaps with present range of claim 17 and thus would render the present range *prima facie* obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Therefore, Yamashiki in view of Matsuoka would render obvious present invention of claim 17.

In col.6, lines 26-56, Yamashiki teaches that a color paste made of his polyamic solution is coated on the substrate and then heat-dried (Preferably at 80-120°C) to form a polyimide precursor colored film, Then a positive photoresist is coated on the polyimide precursor colored film to form a photoresist coating. Then, a mask is placed on the photoresist coating, followed by irradiation with UV rays by using an exposure device. After exposure, the photoresist coating and the polyimide precursor colored film are simultaneously etched with a positive photoresist alkali developing solution. After etching, the unnecessary photoresist coating is separated. The polyimide precursor colored film is then converted to a polyimide colored film by heat treatment, preferably at 200-320°C. Therefore, Yamashiki in view of Matsuoka would render obvious present inventions of claims 18-29, 31, and 34-36.

3. Claims 13 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashiki et al (6,455,208 B1) in view of Matsuoka et al (5,397,682) as applied to claims 12 and 29 above, and further in view of Durham et al (5,876,897).

Yamashiki et al in view of Matsuoka et al is discussed above in Paragraph 2. As discussed above, Yamashiki teaches the use of propyleneglycol monomethyl ether as the co-solvent that can be used together with his solvent that dissolves the polyimide precursor. The propyleneglycol monomethyl ether and 2-heptanone are well known in the art as equivalent organic solvents as evidenced by Durham et al, col.6, lines 47-58. Therefore, one of ordinary skill in the art would have found it obvious to use 2-heptanone as the other solvent in Yamashiki's invention because propyleneglycol monomethyl ether and 2-heptanone were art-recognized equivalent organic solvents at the time the invention was made. Therefore, Yamashiki in view of Matsuoka and further in view of Durham would render obvious present inventions of claims 13 and 30.

4. Claims 15, 16, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashiki et al (6,455,208 B1) in view of Matsuoka et al (5,397,682) as applied to claims 1 and 18 above, and further in view of Mahdi et al (US 2002/0100550 A1).

Yamashiki et al in view of Matsuoka et al is discussed above in Paragraph 2. As discussed above, Yamashiki in view of Matsuoka would render obvious adding an adhesion promoter to a polyimide precursor composition so as to improve an adhesion property of the polyimide coating film to a substrate. Matsuoka includes 3-methacryloxypropyltrimethoxysilane as one of the examples for such adhesion

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promoting compounds, and Mahdi et al (see [0088]) teaches the equivalence of that compound and phenylaminopropytrimethoxysilane (*which is the present adhesion promoter of formula I of claims 15 and 32 as well as the present adhesion promoter of formula XVII of claims 16 and 33*) as adhesion-promoters. Since those two compounds were art-recognized equivalents (as adhesion-promoting compounds) at the time the invention was made, one of ordinary skill in the art would have found it obvious to add phenylaminopropytrimethoxysilane as the adhesion promoter in Yamashiki's polyamic acid solution with a reasonable expectation of improving an adhesion property of the polyimide coating film to a substrate. Therefore, Yamashiki in view of Matsuoka and further in view of Mahdi would render obvious present inventions of claims 15, 16, 32, and 33.

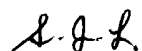
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff, can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

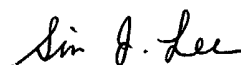
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee
June 4, 2004



Sin J. Lee
Patent Examiner
Technology Center 1700